

Name: () Class:

**ASSUMPTION ENGLISH SCHOOL
PRELIMINARY EXAMINATION 2025**

SCIENCE (CHEMISTRY)

5086 / 01

5088 / 01



**ASSUMPTION
ENGLISH**

A Montfortian Catholic Education Institution

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LEVEL: Sec 4 Express /
 Sec 5 Normal (Academic)

DATE : 3 September 2025

CLASS(ES): Sec 4/2, 4/3, 4/5 SBB, 5/1

DURATION : 1 hour (for both
 Science components)

Additional Materials Provided: 1 sheet of OAS paper

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your NAME, CLASS and INDEX NUMBER at the top of this page and on the OAS paper. **Shade your index number on the OAS paper.**

There are **20** questions on this paper. Answer **all** questions.

For each question, there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in soft pencil on the separate OAS paper.

A copy of the Data Sheet is printed on page 9.

A copy of the Periodic Table is printed on page 10.

The use of an approved scientific calculator is expected, where appropriate.

For Examiner's use:	
Paper 1	/ 20

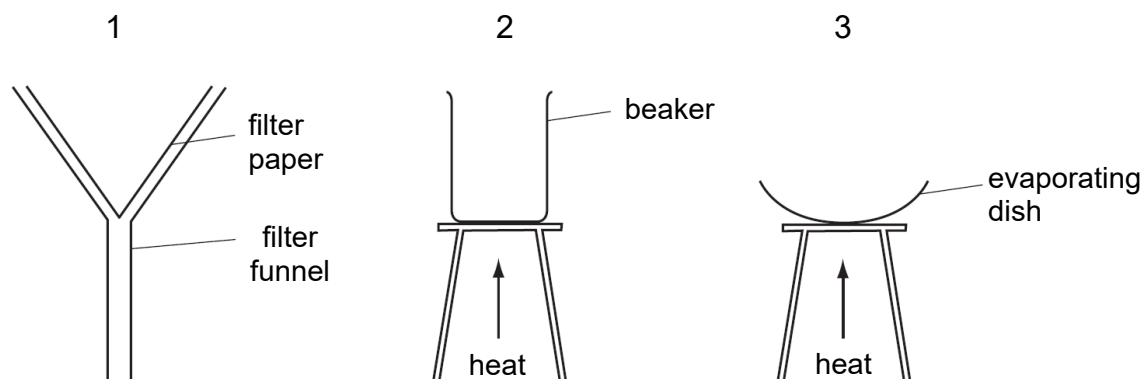
This question paper consists of 10 printed pages including this page.

[Turn over

SECTION A: MULTIPLE CHOICE QUESTIONS [20 MARKS]

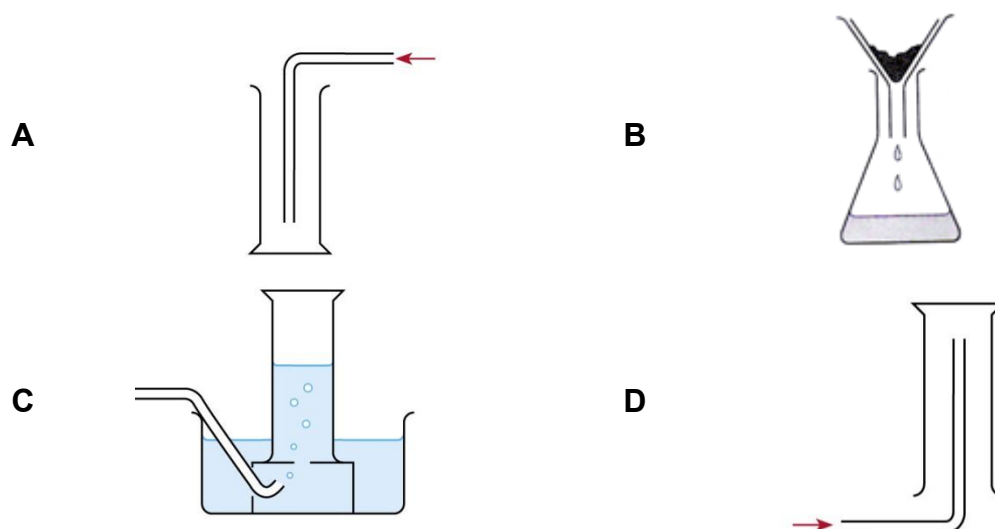
There are 20 questions in this section. Answer **ALL** questions. Choose the correct answer and record your choice on the OAS paper provided.

- 1 The diagrams show three sets of apparatus.

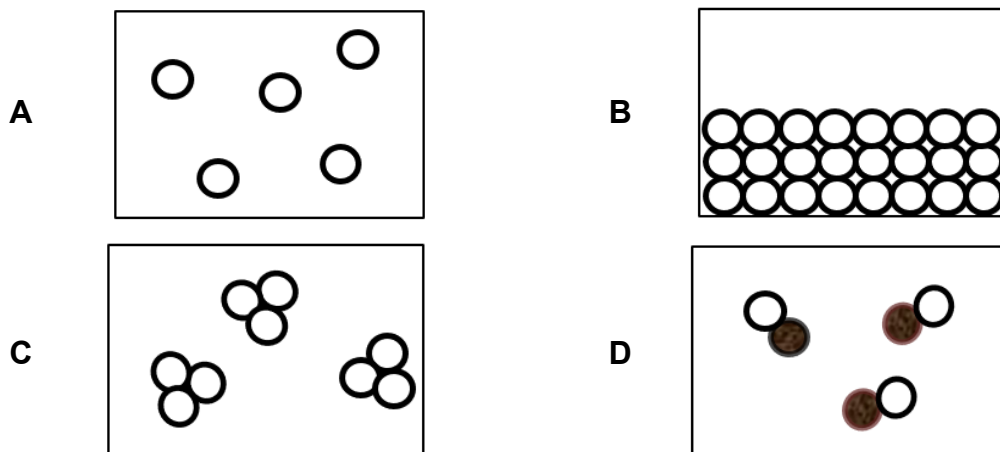


Which apparatus would be used to obtain separate dry samples of sand and salt from a mixture of sand and seawater?

- A** 1 only **B** 3 only **C** 1 and 3 **D** 2 and 3
- 2 Gas **Y** is less dense than air, soluble in water and forms an alkaline solution.
- Which method is used to collect a sample of the gas?



- 3 Which diagram represents a monatomic gas?



- 4 **W**, **X**, **Y** and **Z** are elements in the same period of the Periodic Table. The letters are not the chemical symbols of the elements. Some information about the elements is shown below.

W has an electronic configuration of 2,1.

X loses 1 electron when it reacts.

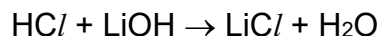
Y has an electron configuration of 2,6.

Z gains 1 electron when it reacts.

Which elements are metal?

- A** **W** and **X** **B** **W** and **Z** **C** **X** and **Y** **D** **Y** and **Z**
- 5 What is the total number of atoms in a molecule of hydrated copper(II) sulfate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$?
- A** 4 **B** 5 **C** 17 **D** 21
- 6 Which element contains the least number of atoms in 1 g?
- A** carbon **B** iodine **C** iron **D** oxygen

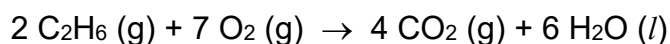
- 7 Hydrochloric acid reacts with lithium hydroxide as shown below.



What is the volume of hydrochloric acid of concentration 2.0 mol/dm^3 needed to fully react with 25.0 cm^3 of lithium hydroxide of concentration 1.0 mol/dm^3 ?

- A** 12.5 cm^3 **B** 25.0 cm^3 **C** 50.0 cm^3 **D** 100.0 cm^3

- 8 40 cm^3 of ethane burns in 210 cm^3 of oxygen in the equation as shown.



What is the volume of carbon dioxide produced at the end of the reaction, measured at room temperature and pressure?

- A** 40 cm^3 **B** 80 cm^3 **C** 120 cm^3 **D** 160 cm^3

- 9 The graph shows how pH changes when different volumes of sodium hydroxide solution are added to 20.0 cm^3 of dilute ethanoic acid.



pH

volume of sodium hydroxide solution/ cm^3

What is the volume of sodium hydroxide solution needed to neutralise 20.0 cm^3 of dilute ethanoic acid?

- A** 10.0 cm^3 **B** 20.0 cm^3 **C** 25.0 cm^3 **D** 30.0 cm^3

10 Which ionic equation represents the neutralisation of aqueous sodium hydroxide with dilute sulfuric acid?

- A** $\text{H}^+ (\text{aq}) + \text{OH}^- (\text{aq}) \rightarrow \text{H}_2\text{O} (\text{l})$
B $2 \text{Na}^+ (\text{aq}) + \text{SO}_4^{2-} (\text{aq}) \rightarrow \text{Na}_2\text{SO}_4 (\text{aq})$
C $\text{NaOH} (\text{aq}) + \text{H}^+ (\text{aq}) \rightarrow \text{Na}^+ (\text{aq}) + \text{H}_2\text{O} (\text{l})$
D $2 \text{Na}^+ (\text{aq}) + \text{H}_2\text{SO}_4 (\text{aq}) \rightarrow \text{Na}_2\text{SO}_4 (\text{aq}) + 2 \text{H}^+ (\text{aq})$

11 Two statements about the structure and properties of metals are given.

statement 1: Metals are malleable and most have high melting points.

statement 2: Metals are good conductors of electricity.

Which of the following correctly describes statements 1 and 2?

- A** Both statements are correct and statement 2 explains statement 1.
B Both statements are correct but statement 2 does not explain statement 1.
C Statement 1 is correct but statement 2 is incorrect.
D Statement 2 is correct but statement 1 is incorrect.

12 The position of metals **R** and **S** in the reactivity series is shown.

K, Na, **R**, Mg, Zn, Fe, **S**, Cu, Ag

Which method is used to extract metals **R** and **S** from their ores?

	metal R	metal S
A	electrolysis	reduction with carbon
B	electrolysis	electrolysis
C	reduction with carbon	reduction with carbon
D	reduction with carbon	electrolysis

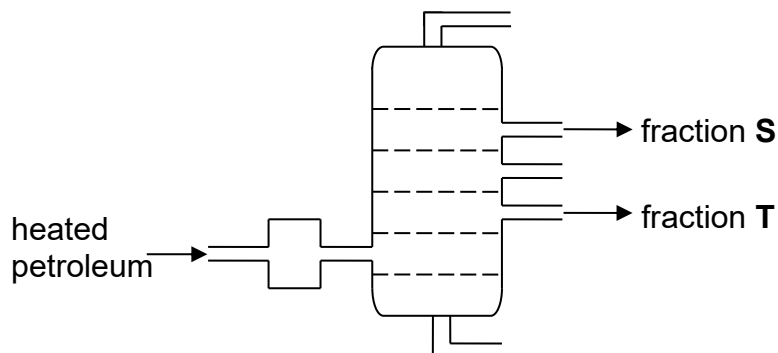
- 13 Metals **P**, **Q**, **R** and **S** are placed in salt solutions as shown in the table.

metal	result of placing metal in solution of			
	salt of P	salt of Q	salt of R	salt of S
P	no reaction	Q displaced	R displaced	no reaction
Q	no reaction	no reaction	no reaction	no reaction
R	no reaction	Q displaced	no reaction	no reaction
S	P displaced	Q displaced	R displaced	no reaction

What is the order of reactivity of the metals from the most reactive to least reactive?

- A** $R \rightarrow Q \rightarrow P \rightarrow S$
B $R \rightarrow P \rightarrow S \rightarrow Q$
C $S \rightarrow P \rightarrow R \rightarrow Q$
D $S \rightarrow R \rightarrow Q \rightarrow P$
- 14 Substance **Y** decolourises acidified potassium manganate(VII) solution, KMnO_4 . Which statement correctly describes the reaction above?
- A** Substance **Y** is an oxidising agent and acidified KMnO_4 has been oxidised.
B Substance **Y** is an oxidising agent and acidified KMnO_4 has been reduced.
C Substance **Y** is a reducing agent and acidified KMnO_4 has been oxidised.
D Substance **Y** is a reducing agent and acidified KMnO_4 has been reduced.
- 15 Which statement about alkanes is **incorrect**?
- A** A molecule of propane contains 2 carbon atoms.
B The general formula is $\text{C}_n\text{H}_{2n+2}$.
C They react with chlorine in a substitution reaction under ultraviolet light.
D The possible products of incomplete combustion are water, soot and carbon monoxide.

- 16** The diagram shows a fractionating column in the fractional distillation of petroleum.



Which row about **S** and **T** are correct?

	S has a greater molecular size than T	S has a higher boiling point than T
A	yes	yes
B	yes	no
C	no	yes
D	no	no

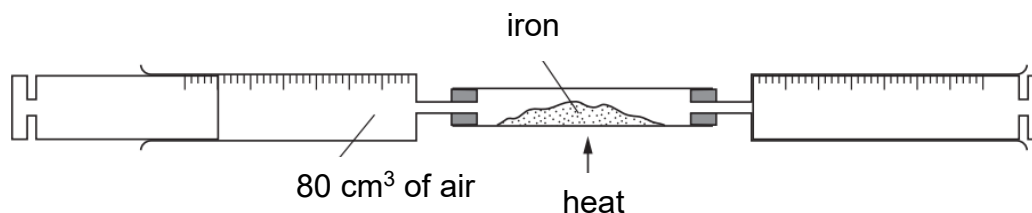
- 17** Tetracontane, $C_{40}H_{82}$, undergoes cracking as shown in the equation below.



What is the molecular formula of product **V** and its physical state at room temperature and pressure?

	molecular formula of V	physical state of V at r.t.p.
A	C_6H_{12}	solid
B	C_6H_{12}	gas
C	C_4H_{10}	solid
D	C_4H_{10}	gas

- 18 Which statement about vegetable oil and margarine is correct?
- A Both vegetable oil and margarine are liquids at room temperature.
 - B Margarine has a lower melting point than vegetable oil.
 - C Vegetable oil has more carbon-carbon double bonds than margarine.
 - D Vegetable oil is made from margarine by hydrogenation.
- 19 80.0 cm³ of a sample of air is trapped in a syringe. The air is slowly passed over heated iron in a tube until there is no further decrease in volume.



When cooled to the original temperature, what volume of gas remains?

- A 16.8 cm³
 - B 40.0 cm³
 - C 60.0 cm³
 - D 63.2 cm³
- 20 Which process removes carbon dioxide from the atmosphere?
- A combustion of carbon-containing fuel
 - B deforestation
 - C photosynthesis
 - D respiration

– End of Paper 1 –

Data Sheet**Colours of Some Common Metal Hydroxides**

aluminium hydroxide	white
calcium hydroxide	white
copper(II) hydroxide	light blue
iron(II) hydroxide	green
iron(III) hydroxide	red-brown
zinc hydroxide	white

The Periodic Table of Elements

Group																			
1	2	Key												13	14	15	16	17	18
		proton (atomic) number atomic symbol relative atomic mass																	
		1 H hydrogen 1																	
3 Li lithium 7	4 Be beryllium 9													5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24													13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84		
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium —	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131		
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids		72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —	
87 Fr francium —	88 Ra radium —	89–103 actinoids		104 Rf rutherfordium —	105 Db dubnium —	106 Sg seaborgium —	107 Bh bohrium —	108 Hs hassium —	109 Mt meitnerium —	110 Ds darmstadtium —	111 Rg roentgenium —	112 Cn copernicium —	113 Nh nihonium —	114 Fl flerovium —	115 Mc moscovium —	116 Lv livermorium —	117 Ts tennessine —	118 Og oganesson —	
lanthanoids		57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175			
actinoids		89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —			

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

The Avogadro constant, $L = 6.02 \times 10^{23} \text{ mol}^{-1}$.